PATHOLOGY AND BACTERIOLOGY

UNDER THE CHARGE OF

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Experimental Observations on the Pathogenesis of Gall-bladder Infections in Typhoid, Cholera and Dysentery.—Starting with the well-known fact that the chronic carrier of organisms of the typhoid group became such only as the result of infection which in the majority of cases is localized in the gall-bladder, NICHOLAS (*Jour. Exper. Med.*, 1916, xxi, 497) reports a series of animal experiments designed to prove the descending route of infection of the gall-bladder by organisms filtered from the blood by the liver and secreted in the bile. The writer states that the ascending route is scarcely to be considered, while the work of Koch and Chiarolanza (1908) which has led to the acceptance of the direct infection from the blood through the gall-bladder wall as the usual mode of infection must be discredited. Koch drew his conclusions from the histological picture in human typhoid cholecystitis, by demonstrating bacillary emboli in the mucosal lining. Chiarolanza tied the cystic duct and immediately injected typhoid bacilli, later recovering the organisms from the gall-bladder. Doerr, it is pointed out, had performed the same experiment more correctly in 1905. His injection of bacilli was not made until several days after the ligation of the cystic duct. This eliminated the initial hemorrhage incident to the ligation, which Nichols is convinced gave Chiarolanza a dilute blood culture with positive results in the bile, inasmuch as Doerr obtained negative results by waiting several days before making the intravenous injection. In developing his thesis, the two main conditions to be met are, first, that the bacilli may get into the bile, and second that they may be able to multiply there. To demonstrate the first point, a common duct fistula was devised, using a capillary glass cannula with a slender rubber tube leading to the exterior where a sterile receptacle was attached to collect the bile. Then, employing both subcutaneous and intravenous injections of bacilli, the experimenter determined that the organisms appeared in the bile after short intervals. While bacteria may be obtained, true lesions of the gall-bladder occur in only 50 per cent. of injected animals, and the author believed that *if* an explanation of the failure of the intravenous injection to produce 100 per cent. of lesions could be found, it might furnish a clue to the whole problem. The relation of gall-bladder lesions to the number of bacilli in the bile was investigated, having first demonstrated by actual count of the colonies in plated specimens of bile that the number of bacteria could be influenced by the site of injection. It was found that injection of the mesenteric veins gave more organisms in the specimens of bile subsequently obtained, while the gall-bladders of these animals showed more frequent lesions. An interesting point also brought out in this connection is that animals immunized against the type of organism injected showed more bacilli in the bile, while the incidence of gall-bladder lesions was also higher. This indicates a high immunity with the bacteria freely eliminated by the liver as a result of an agglutinative process. The type of lesion produced in the gall-bladder is not discussed by the author. Having demonstrated the ability of the organisms to enter the bile and gall-bladder by the descending route, as a result of a filtration action of the liver, the author next turns to the subject of the antiseptic properties of the bile, and presents a number of interesting facts. Among others, he quotes Okada to the effect that the bile from the gall-bladder is less alkaline and contains more solids than that in the liver. Also, that healthy bile may have a distinctly bactericidal action on the typhoid bacillus, though it has been used as a culture medium for this organism. And finally, that rabbit and especially guinea-pig bile have a very high bactericidal power. Here is noted the fact, too often not realized, of the differences between man and the experimental animals. The reactions of various types of bile, including that from the ox, the human, from rabbits and from guinea-pigs, show a wide variation. The highest alkalinity by far is found in the guinea-pig, with the rabbit next in order. This seems to point to alkalinity as the source of the bactericidal power, especially since neutralization of the alkalinity was found to reduce this power. This brings the author to a discussion of the question of prophylaxis in the diseases under consideration, with a view to preventing gall-bladder infections and hence, carriers. This subject he treats conservatively, advising against the employment of what is really experimental treatment on a patient already suffering from a severe acute infection, though if a mild therapy were of value, he feels it to be justified. He adds that though alkaline treatment in cholera is useful to combat uremia, it might not be as useful in this as in the other infections since the cholera vibrio flourishes in an alkaline medium. However, after recovery from an acute attack of one of these diseases, the patient should not be discharged as cured until the possibility of his being a carrier has been eliminated. For this, in addition to examination of the stool, the writer believes that Einhorn's duodenal tube should be of value. Here it may be stated that Garbat has recently reported the successful application of this method for the determination of carriers among the convalescent typhoid patients in a New York Hospital.

Hyaline Degeneration of the Arteries.—The study of the lesions occurring in human arteries is still in the stage of the collecting of facts and has not yet arrived at the time for setting up broad principles. Each independent study assists in elucidating particular points concerning the nature and origin of pathological processes in arteries. Too many attempts have been made in the earlier stages of arterial study to formulate laws concerning all the processes associated with arteriosclerosis. At the present time, very few of these theories are